

Abstract of the Disclosure:

An improved insitu hard mask open strategy is performed before carrying out a metal etching process. The method for opening the hard mask made of  $\text{SiO}_2$ ,  $\text{Si}_3\text{N}_4$  or  $\text{SiON}$  includes providing a  
5 substrate having thereon at least one metal layer, the hard mask layer, and a patterned photoresist layer overlying the hard mask layer. The hard mask layer is etched in a plasma etching process using an etchant source gas which is formed of a fluorine containing gas and oxygen. The plasma processing  
10 chamber used for etching the hard mask layer is the same as the plasma processing chamber in which the at least one metal layer is etched in another plasma etching process after the hard mask layer has been etched.

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